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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,033	08/04/2003	Chien-Meen Hwang	95-538	4695
20736 7590 08/02/2007 MANELLI DENISON & SELTER 2000 M STREET NW SUITE 700 WASHINGTON, DC 20036-3307			EXAMINER WANG, TED M	
			ART UNIT 2611	PAPER NUMBER
			MAIL DATE 08/02/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/633,033

Applicant(s)

HWANG ET AL.

Examiner

Ted M. Wang

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1, 4, 5 and 8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 5 and 8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/05/2007 has been entered.

### ***Response to Arguments***

2. Applicant's arguments, with respect to the interview summary, dated 7/19/2007, have been fully considered but they are not persuasive. The Examiner has thoroughly reviewed Applicants' arguments but firmly believes that the cited reference to reasonably and properly meet the claimed limitations.

### **Independent Claims 1 and 5**

(1) *Applicants' argument* – "Claims 1 and 5 recite that the filtering further includes filtering any (all) DC energy from the first and second components. And Carsello requires DC energy to be present in his invention. See column 4, lines 52-57 of Carsello where it is taught that the DC term 406 accounts for about 15% of the pilot signal energy and is a critical element of the PAS-QAM signal. Carsello further teaches that simulations which notch out this DC term "have shown unacceptable receiver sensitivity..." Thus, Carsello teaches away from notching out DC energy and if the notch filters of

Carsello were employed in the AAPA, DC energy would be present, but distortion thereof would be filtered " as recited.

*Examiner's response –*

Carsello uses Fig.4 to illustrate that the undistorted PSA-QAM signal 402 will have significant impact if the DC Notch filter is used to filter out the DC term 406. i.e. it will remove approximate 15% of the pilot energy and cause the receiver having an unacceptable receiving sensitivity (column 4, lines 52-57). And then, column 5 lines 19-25 of Carsello's reference further teaches that there is a solution to solve above mentioned issue by offsetting the frequency of a receiver with an offset frequency of one-half the pilot symbol rate (Fig.6). In this way, the pilot signal harmonics have been spread by the Doppler shifting. Also, a DC notch will not affect the pilot signal, which is crucial for achieving good sensitivity.

Thus, for the explanation addressed in the above paragraph, the rejection under 35 U.S.C. 103(a) with AAPA in view of Carsello's reference is adequate.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the

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differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4, 5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art of the instant application in view of Carsello (US 6,370,211).

- With regard claim 1, the admitted prior art of the instant application teaches a method in an OFDM direct conversion receiver (Fig.1 and page 1 line 21) configured for receiving a wireless signal (Fig.1 element 12 input signal), the method comprising:

recovering first and second components from the wireless signal (Fig.1 element 12 input signal) by mixing (Fig.1 elements 18a and 18b and page 1 line 23) the wireless signal with first (Fig.1 element 16 output to the input of mixer 18a) and second (Fig.1 element 22 output to the input of mixer 18b) carrier frequency signals, respectively (page 1 lines 21-25), at the analog front end (Fig.1 elements 12-20b), the second carrier frequency signal phase-shifted by a prescribed amount relative to the first carrier frequency signal (Fig.1 elements 16, 18a, 18b and 22 and page 1 lines 21-25);

filtering a pilot carrier from each of the first and second components (Fig.1 elements 20a and 20b, where it is inherent that the pilot carrier can be removed by the low pass filter, 20a and 20b, as admitted by the instant

application, page 7, line 33-34, "Note that the pilot notch filter 100 also can be implemented as a low pass filter" as recited.) to obtain filtered first and second components (Fig.1 elements 20a and 20b outputs (I and Q), respectively;

estimating amplitude and phase imbalances between the filtered first and second components according to a time domain based estimation algorithm (page 2 lines 10-16); and

compensating for the amplitude and phase imbalances in the recovered first and second components (page 2 lines 10-16);

wherein the filtering further includes suppressing any pilot energy from the first and second components (Fig.1 elements 20a and 20b, where it is inherent that the pilot energy of the first and second components is suppressed since the pilot carrier has been removed by the low pass filter, 20a and 20b, respectively);

The admitted prior art of the instant application subject matter as described in the above paragraph except for specifically teaching wherein the filtering further includes filtering any DC energy from the first and second components and the filtered first and second components having equal power distribution.

However, Carsello teaches a DC notch filter (Fig.3 element 310) connected to a low pass filter (Fig.3 element 308) to remove any DC energy (column 4 lines 29-30) such that the filtered first and second components

having equal power distribution so that the receiver performance can be improved since the equal power distribution is due to the filtering of the pilot carrier and the DC components as described in the page 8, lines 7-8, of the instant application.

In general, the undistorted PSA-QAM signal will have significant impact if the DC Notch filter is used to filter out the DC term. i.e. it will remove approximate 15% of the pilot energy and cause the receiver having an unacceptable receiving sensitivity (column 4, lines 52-57). In order to solve above-mentioned issue, it requires offsetting the frequency of a receiver with an offset frequency of one-half the pilot symbol rate (Fig.6 and column 5 lines 19-25). In this way, the pilot signal harmonics have been spread by the Doppler shifting. Also, a DC notch will not affect the pilot signal, which is crucial for achieving good sensitivity (column 5 lines 19-25).

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to implement the DC notch filter (Fig.3 element 310) as taught by Carsello by connecting the notch filter right after the low pass filters, 20a and 20b, of the admitted prior art of the instant application, respectively, in order to improve the receiver sensitivity in a PSA-QAM system.

- With regard claim 4, the limitation of “wherein the filtering includes suppressing the pilot energy and the DC energy using a pilot notch filter and a DC notch filter, respectively” has been addressed in the above

paragraphs (claim 1). Since the pilot carrier is filtered out by the low pass filters 20a and 20b, respectively, it would have been obvious to one having ordinary skill in the art at the time the invention was made to consider that the low pass filters, 10a and 20b, been used in the modified circuit of the admitted prior art of the instant application and Carsello would get the same performance result as that of a notch filter (It also admitted by the instant application, page 7, line 33-34, "Note that the pilot notch filter 100 also can be implemented as a low pass filter" as recited.)

- With regard claim 5, which is a receiver claim related to claim 1, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 8, which is a receiver claim related to claim 4, all limitation is contained in claim 4. The explanation of all the limitation is already addressed in the above paragraph.

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax



phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M. Wang

A handwritten signature in black ink, appearing to read 'Ted M. Wang', with a stylized, sweeping flourish extending from the end of the signature.

Ted M Wang  
Examiner  
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